When pig bacteria fly: Dissemination of antibiotic-resistant *Staphylococcus aureus* in regions of dense industrial hog production in North Carolina

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Wednesday, September 28, 2016  
2301 McGavran-Greenberg Hall  
12:20 – 1:10 p.m.

**Abstract:**

In North Carolina, hogs are raised for meat production in industrial hog operations (IHOs) that house hundreds of the animals in confined barns. These operations are disproportionately located in communities of color and there is concern that IHO-related pollutants can negatively impact nearby communities. IHO contract growers are required to administer antibiotics to hogs, a practice that can lead to emergence of antibiotic resistant (ABR) bacteria. ABR bacteria can cause infections in animals and humans that are difficult and costly to treat. Alongside our community partner (REACH), we conducted a study to investigate whether IHO workers, community residents who do not work in IHOs, and young children (<7 yrs.) living in their households nasally carry ABR *Staphylococcus aureus* (*S. aureus*), a type of bacteria that can be shared between hogs and humans. We found that a greater proportion of children living with IHO workers carried multi-drug resistant (MDRSA) (23% vs. 8%) and methicillin-resistant *Staphylococcus aureus* (MRSA) (14% vs. 6%) in their noses compared to children whose household members do not work in IHOs. One limitation of this study is that we were unable to test IHO hogs for carriage of ABR *S. aureus*. As a result, we have since investigated whether recently-slaughtered, conventionally-raised (CR) hogs and hogs raised without antibiotics (RWA) differentially carry ABR *S. aureus*. We found that 91% of *S. aureus* recovered from CR hogs was MDRSA compared to 7% in RWA hogs. Finally, to investigate the potential for environmental exposure, we sampled the air adjacent barn vents on one IHO. We found that 100% (26 of 26) of *S. aureus* isolates recovered from the air were MDRSA. Future work will include extensive spatial analyses to further investigate environmental exposure to ABR *S. aureus* in communities near IHOs.